

What is claimed is:

09887345 "052501
T022095266

1. A production process for a low-molecular (meth)acrylic acid (salt)-based polymer, which comprises the step of polymerizing an aqueous solution of at least one monomer component of a high concentration in the presence of an alkaline substance under conditions where polymerization catalysts are used, wherein: 100 to 95 mol % of the at least one monomer component is a monoethylenically unsaturated monocarboxylic acid (salt) monomer (a) having 3 to 6 carbon atoms; and 0 to 5 mol % of the at least one monomer component is a monoethylenically unsaturated monomer (b) copolymerizable with the monomer (a) (wherein the total of (a) and (b) is 100 mol %); and wherein: a persulfate salt and hydrogen peroxide are used together as the polymerization catalysts; and the entirety of the alkaline substance as used is set not to be more than 99 mol % of the amount which is necessary for neutralizing all acid groups of the at least one monomer component; and the dropwise addition of the hydrogen peroxide is completed at the latest 10 minutes earlier than the completion time of the dropwise addition of the at least one monomer component.

2. A production process for a low-molecular (meth)acrylic acid (salt)-based polymer, which comprises the step of polymerizing an aqueous solution of at least one monomer component of a high concentration in the presence of an alkaline substance under conditions where polymerization catalysts are used, wherein: 100 to 95 mol % of the at least one monomer component is a monoethylenically unsaturated monocarboxylic acid (salt) monomer (a) having 3 to 6 carbon atoms; and 0 to 5 mol % of the at least one monomer component is a

monoethylenically unsaturated monomer (b) copolymerizable with the monomer (a) (wherein the total of (a) and (b) is 100 mol %); and wherein: a persulfate salt and hydrogen peroxide are used together as the polymerization catalysts; and the entirety of the alkaline substance as used is set not to be more than 99 mol % of the amount which is necessary for neutralizing all acid groups of the at least one monomer component; and the amount of the hydrogen peroxide as added till the initiation of the dropwise addition of the at least one monomer component is kept from exceeding 10 % of the entirety of the hydrogen peroxide as added.

3. A production process according to claim 1, wherein: when the weight-average molecular weight of the resultant polymer is less than 20,000, the final concentration of the resultant polymer is not less than a value given by multiplying the weight-average molecular weight of the resultant polymer by 0.002; and when the weight-average molecular weight of the resultant polymer is not less than 20,000, the final concentration of the resultant polymer is not less than a square root of a value given by multiplying the weight-average molecular weight of the resultant polymer by 0.08.

4. A production process according to claim 2, wherein: when the weight-average molecular weight of the resultant polymer is less than 20,000, the final concentration of the resultant polymer is not less than a value given by multiplying the weight-average molecular weight of the resultant polymer by 0.002; and when the weight-average molecular weight of the resultant polymer is not less than 20,000, the final concentration of the resultant polymer is not less than a square root of a value given by multiplying the weight-average molecular weight of the

resultant polymer by 0.08.

5. A production process according to claim 1, wherein the final concentration of the resultant polymer is not less than 30 weight %.

6. A production process according to claim 2, wherein the final concentration of the resultant polymer is not less than 30 weight %.

7. A production process according to claim 1, wherein the dispersion degree of the resultant polymer is in the range of 1.5 to 5.0, wherein the dispersion degree is a quotient given by dividing the weight-average molecular weight by the number-average molecular weight.

8. A production process according to claim 2, wherein the dispersion degree of the resultant polymer is in the range of 1.5 to 5.0, wherein the dispersion degree is a quotient given by dividing the weight-average molecular weight by the number-average molecular weight.

9. A production process according to claim 1, wherein the ratio (by weight) between the persulfate salt and the hydrogen peroxide which are used together as the polymerization catalysts is in the range of hydrogen peroxide : persulfate salt = 1 : 0.1-5.0.

10. A production process according to claim 2, wherein the ratio (by weight) between the persulfate salt and the hydrogen peroxide which are used together as the polymerization catalysts is in the range of hydrogen peroxide : persulfate salt = 1 : 0.1-5.0.

11. A low-molecular (meth)acrylic acid (salt)-based polymer, which is obtained by the production process as recited in claim 1.

12. A low-molecular (meth)acrylic acid (salt)-based polymer, which is obtained by the production process as recited in claim 2.

13. A low-molecular (meth)acrylic acid (salt)-based polymer, which is obtained by a process including the step of polymerizing at least one monomer component of which 100 to 95 mol % is a monoethylenically unsaturated monocarboxylic acid (salt) monomer (a) having 3 to 6 carbon atoms, and of which 0 to 5 mol % is a monoethylenically unsaturated monomer (b) copolymerizable with the monomer (a) (wherein the total of (a) and (b) is 100 mol %), wherein: the polymer has a weight-average molecular weight of 1,000 to 30,000 and a dispersion degree of 1.5 to 5.0; and a 40 weight % aqueous solution of the polymer has a hydrogen peroxide content of 5 to 500 ppm and a hazen value of not more than 300.

14. A detergent composition, which comprises the low-molecular (meth)acrylic acid (salt)-based polymer as recited in claim 11.

15. A detergent composition, which comprises the low-molecular (meth)acrylic acid (salt)-based polymer as recited in claim 12.

16. A detergent composition, which comprises the low-molecular (meth)acrylic acid (salt)-based polymer as recited in claim 13.

17. A water-treating agent, which comprises the low-molecular (meth)acrylic acid (salt)-based polymer as recited in claim 11.

18. A water-treating agent, which comprises the low-molecular (meth)acrylic acid (salt)-based polymer as recited in claim 12.

5 19. A water-treating agent, which comprises the low-molecular (meth)acrylic acid (salt)-based polymer as recited in claim 13.

0887345 062504
105290 54E/8860